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Theoretical Study of Polar and Global Ozone Changes Using a Coupled Radiative-Dynamical 2-D Model

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ABSTRACT

Our existing 2-D model has recently been updated to incorporates ozone-temperature feedbacks with more comprehensive radiative transfer calculations and more detailed temperature data input. We attempt to address the following issues:

(a) Given the observed temperature changes for the past eight years, quantitatively how much ozone change can be produced by the dynamical effect of the temperature change over the Arctic and Antarctic?

(b) How much of the reported change in globally averaged ozone can be accounted for by temperature changes?

(c) The role of the diabatic circulation changes in the lower stratosphere in determining the timing of the polar spring maximum and minimum.

(d) The role of the seasonal change in the diabatic circulation in causing the fall minimum over the Arctic and the Antarctic.